Teacher's Guide

Animal Trackers:

North American Mammals

Apple

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ANIMAL TRACKERS
INTRODUCTION

Animal Trackers is designed to promote a process-oriented approach to the study of North American mammals. While the product provides ample opportunity for the absorption of content knowledge, equal emphasis is placed on the nature of the learning experience.

In **Animal Trackers**, students play the role of someone who is trying to identify an animal in the wild, without actually seeing the animal. They must rely on field signs, such as tracks, dens, broken brush, scraps of food, and so on. To assist them in their quest, students can record their observations in an on-line Notepad. They also have access to an on-line Field Guide, where they can search for information that correlates with the clues that they have found.

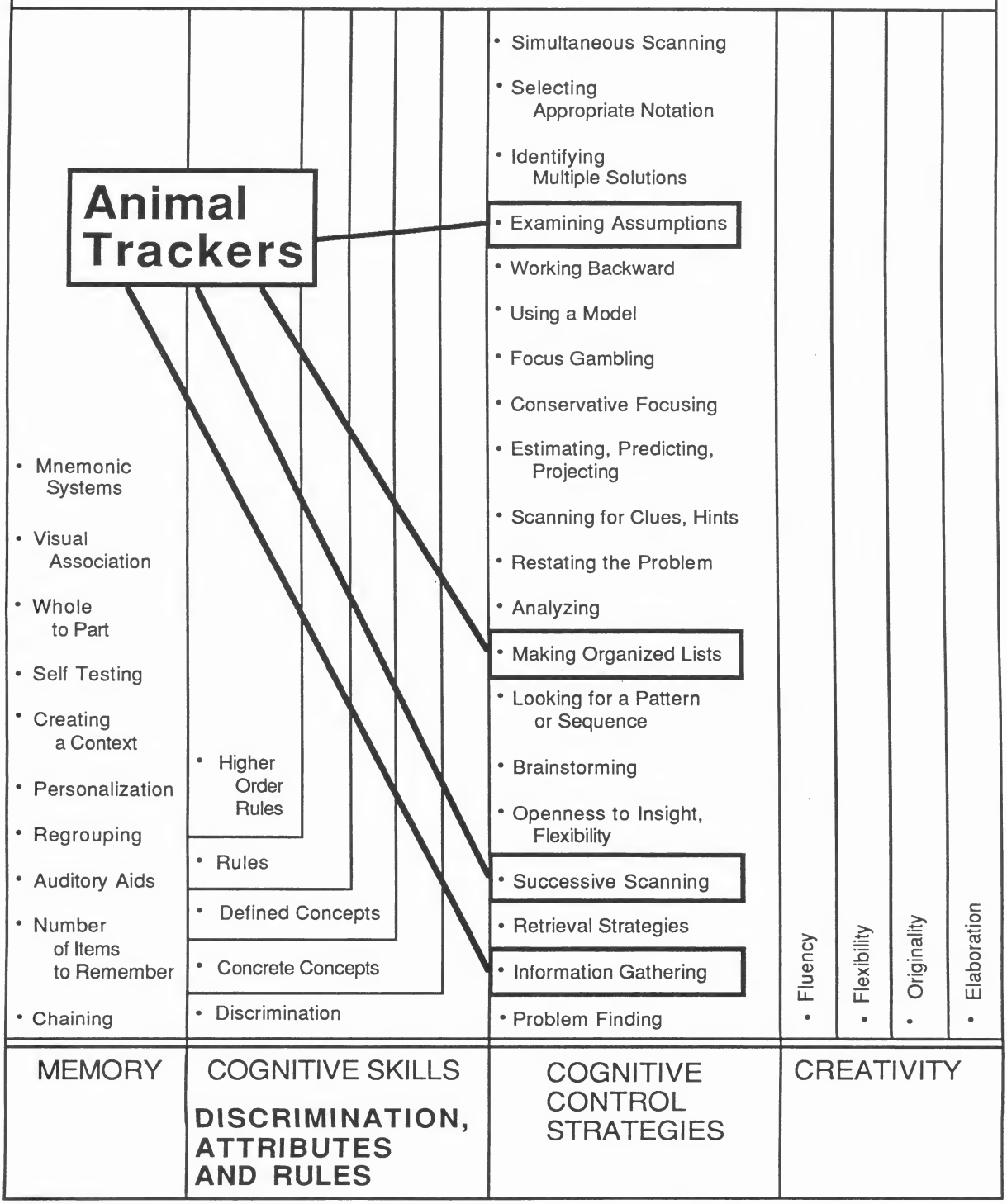
The animals included within **Animal Trackers** are all North American mammals. Students may choose to make their search in a woodland, grassland, or desert biome. Within the chosen biome, they must decide where to search for clues. There are three levels of difficulty. At the Novice Tracker level, one of eight possible animals has left signs. At the Experienced Tracker level, one of 24 possible animals has left signs. At the Expert Tracker level, two of 24 possible animals have left signs, and both must be identified.

To be an effective animal tracker, the student must think like a detective. Finding clues is easy; interpreting the clues is harder. Finding one clue is seldom sufficient to identify the animal, because several different animals can leave similar signs. By accumulating and studying several different clues, the student can apply a process of elimination, and eventually arrive at an identification.

WINGS for learning has adopted a matrix of problem solving skills. In the process of identifying an unknown animal in **Animal Trackers**, students develop several of the skills identified in the Problem Solving Skills Matrix. Among these problem solving skills are Examining Assumptions, Making Organized Lists, Successive Scanning, and Information Gathering.

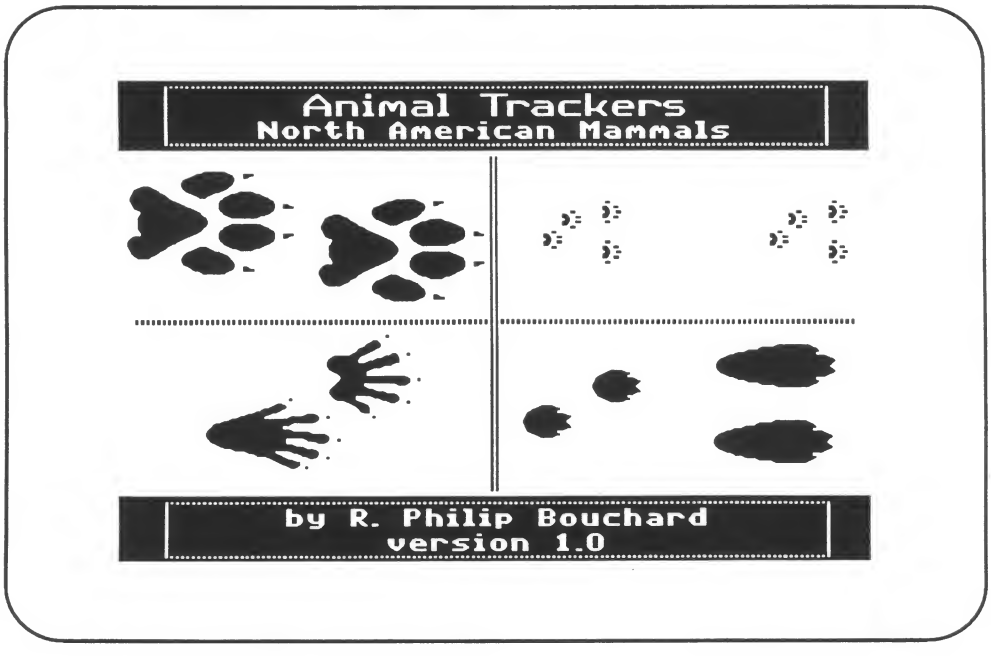
Animal Trackers is designed to work with an Apple computer with at least 64K of memory. A color monitor is recommended but not necessary.

Problem Solving Skill Matrix



This matrix was developed under a Title IVC grant to Rochester, MN schools under the direction of Donna Stanger. The matrix is based on the works of Gagne, but also reflects Piaget, Guilford, Meeker, Bruner, Bloom and Torrance.

ANIMAL TRACKERS
OBJECTIVES



SUBJECT AREA: Life science, environmental education

GRADE RANGE: 4 – 10

OBJECTIVES:

To use indirect evidence of the presence of an animal to determine what the animal is.

To correlate the evidence with facts presented in a "field guide" in order to make identification.

To read textual clues, determining what information is significant and what is not.

To use a process of elimination to narrow a list of possibilities.

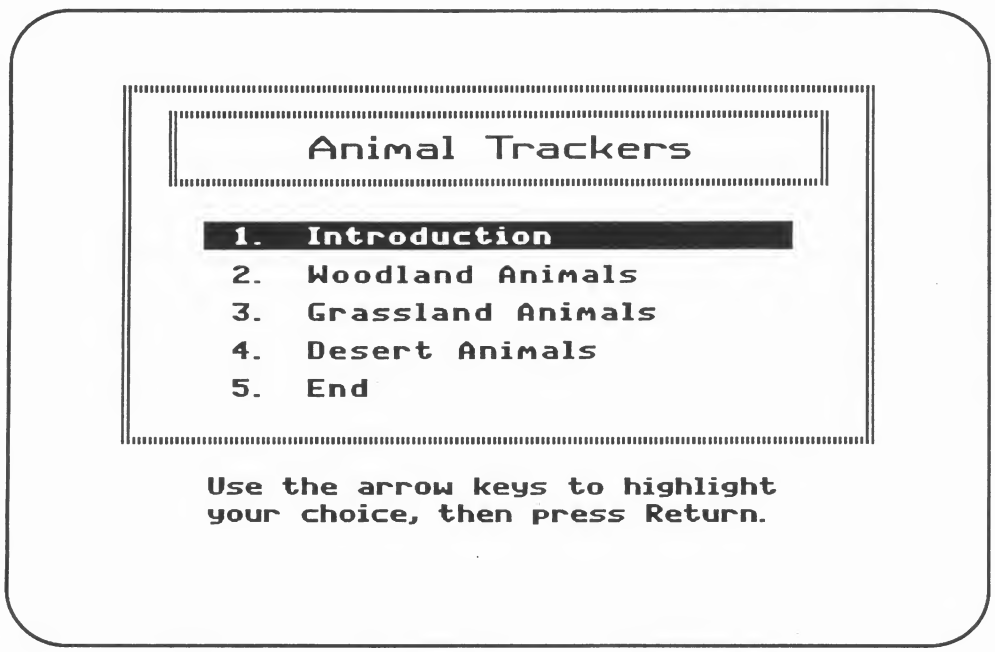
To form hypotheses and test them.

To take notes as information is collected.

To extract useful information from an illustration.

ANIMAL TRACKERS
PROGRAM DESCRIPTION

Animal Trackers begins by displaying the Main Menu, which offers five choices:



1. **Introduction** – A brief overview of the program.
2. **Woodland Animals** – Attempt to identify an animal in a woodland biome.
3. **Grassland Animals** – Attempt to identify an animal in a grassland biome.
4. **Desert Animals** – Attempt to identify an animal in a desert biome.
5. **End** – Finish using **Animal Trackers**. Students are prompted to either turn off the computer or use another disk.

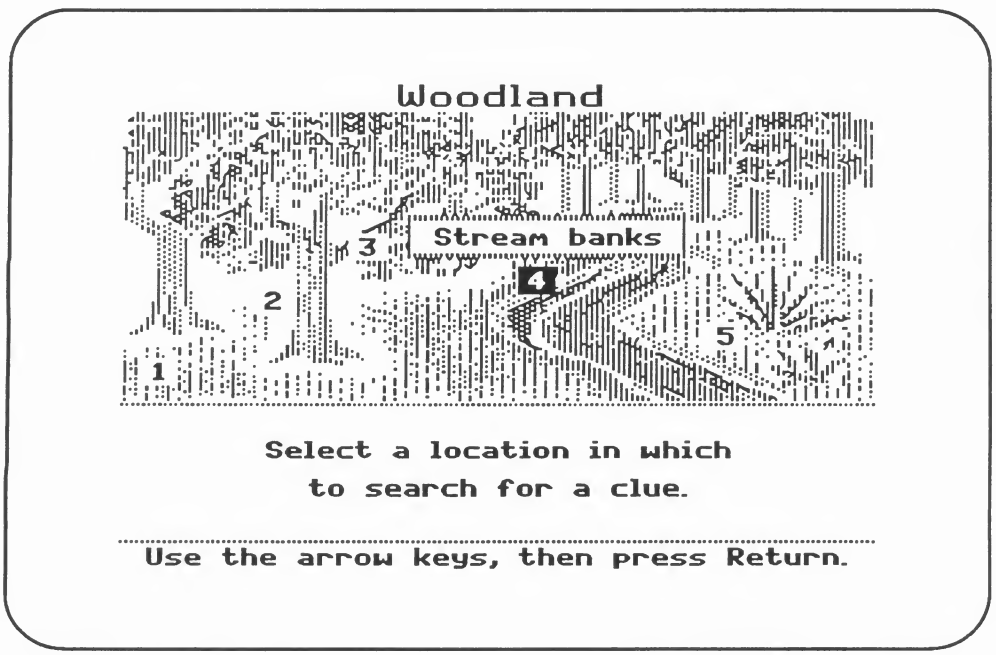
Use the arrow keys to highlight an option, and press RETURN to make a selection. Prompts are found at the bottom of each screen.

PLAYING ANIMAL TRACKERS

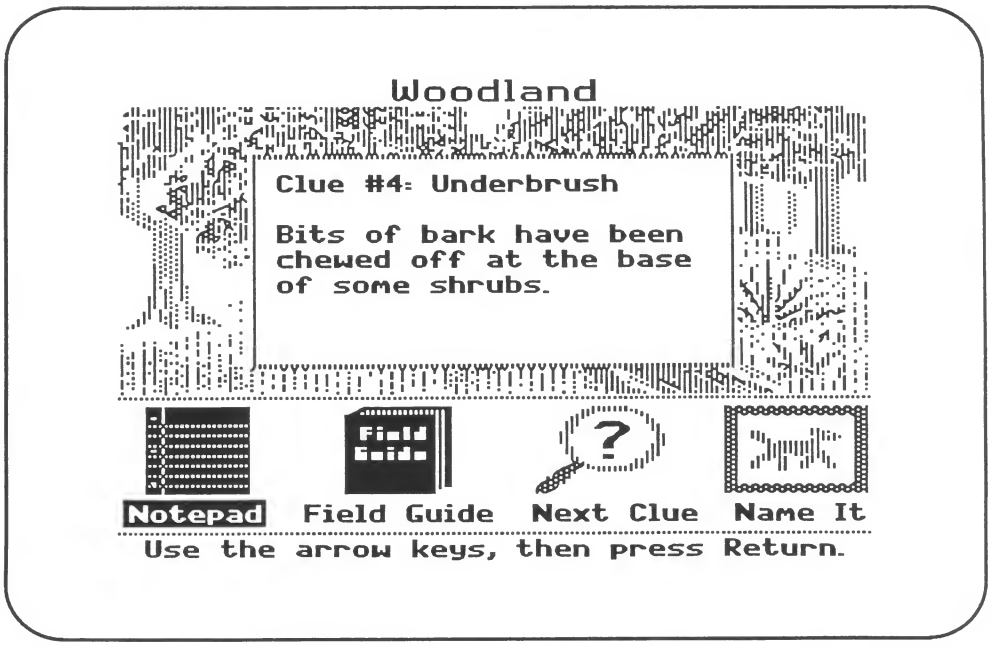
Animal Trackers lets students identify mystery animals from one of three biomes: woodland, grassland, or desert. The student selects a biome from the Main Menu. The challenge is the same in each of the biomes; the differences come from a different selection of animals and their accompanying clues.

After choosing a biome, the student must select a difficulty level. At the Novice Tracker level, any one of eight animals may have left clues. The challenge is to identify this animal. At the Experienced Tracker level, any one of 24 animals may have left clues. At the Expert Tracker level, any *two* of 24 animals may have left clues, and both must be identified.

After choosing a difficulty level, the student sees a picture of a site within the selected biome, and is prompted to search for a clue.



Students can search for clues in any of five locations on the screen. By pressing the arrow keys, the different locations are highlighted. Pressing RETURN reveals a description of a clue at the selected location. The clue may be a text description of what is seen, or it may be a graphic representation of a track. There may be more than one clue at a location, or there may not be a clue at all. If there is more than one clue at the location, then only one clue at a time is revealed.



After a clue has been found, four new options appear at the bottom of the screen. These are the tools the student can use to identify the mystery animal (or animals). Select an option by pressing the arrow keys, then RETURN.

Notepad – Take notes on the clues that have been uncovered.

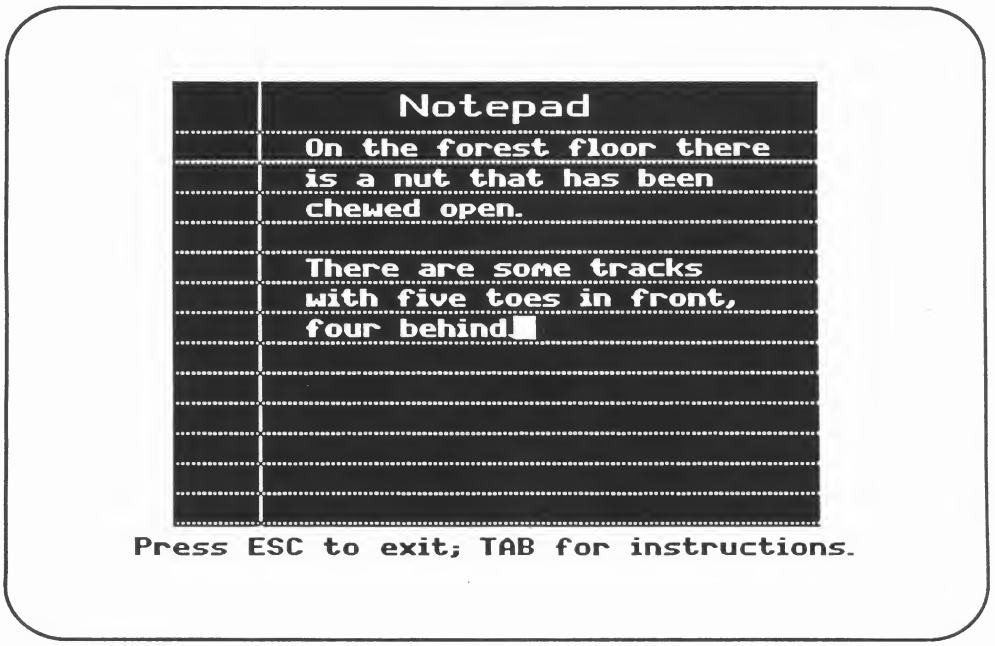
Field Guide – Match the clues with the information about the animal.

Next Clue – Search for another clue.

Name It – Attempt to identify the mystery animal.

USING THE NOTEPAD

Once a clue has been looked at, it is not possible to see it again. Therefore it is very important to take thorough notes about the clues. The Notepad option makes it easy to record notes.

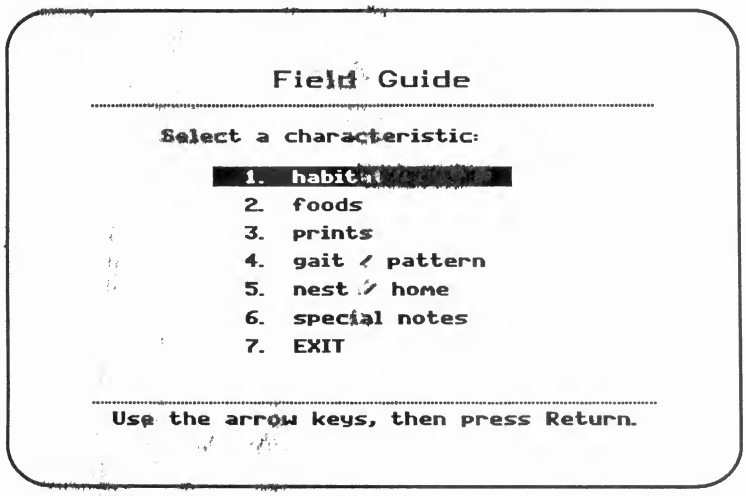

Notepad
On the forest floor there
is a nut that has been
chewed open.
There are some tracks
with five toes in front,
four behind.
Press ESC to exit; TAB for instructions.

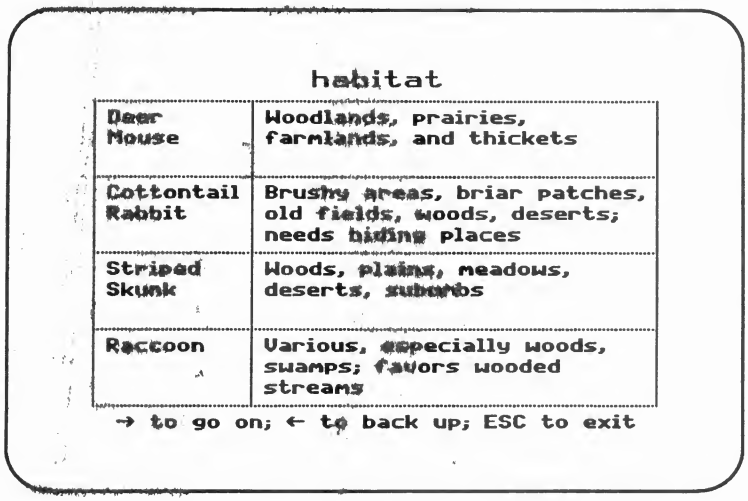
When the Notepad is selected, the screen displays a simulated sheet of notebook paper. Up to 48 lines of text can be entered. Return to the game at any time by pressing the ESCAPE key. Everything typed into the Notepad will remain there until the completion of the activity.

- Delete a character by pressing the DELETE key, or CONTROL-D on the Apple II+.
- Press RETURN to start a new paragraph.
- Move the cursor through the text by pressing the → and ← keys.
- Scroll the cursor up and down through the text by pressing the ↑ and ↓ keys, or CONTROL-K and CONTROL-J on the Apple II+.
- See a brief summary of these instructions at any time the Notepad is in use by pressing the TAB key, or CONTROL-I on the Apple II+.

USING THE FIELD GUIDE

The Field Guide contains information on several different topics about the animals that might be found in the biome. At the Novice Tracker level, the Field Guide contains information for eight animals on each topic. At the Experienced and Expert Tracker levels, the guide contains information for 24 animals on each topic.




habitat
Deer Mouse
Woodlands, prairies, farmlands, and thickets
Cottontail Rabbit
Brushy areas, briar patches, old fields, woods, deserts; needs hiding places
Striped Skunk
Woods, plains, meadows, deserts, suburbs
Raccoon
Various, especially woods, swamps; favors wooded streams
→ to go on; ← to back up; ESC to exit

- When the Field Guide is selected, the screen displays a menu of topics to examine. Select a topic with the arrow keys, and press RETURN.
- Each screen in the Field Guide displays information about four animals. Press the → key or RETURN to see information about the next four animals. Press the ← key to see the previous page of information.
- Exit from a topic by pressing the ESCAPE key.
- To leave the Field Guide, select Exit on the Field Guide menu, or press the ESCAPE key.

SEARCHING FOR ANOTHER CLUE

Select Next Clue to look for another clue left by the mystery animal. The current clue will disappear, and the student is again prompted to search for a clue.

- By pressing the arrow keys, different locations in the site are highlighted. Pressing RETURN reveals a description of a clue at the selected location.
- A clue may be a text description of what is seen, or it may be a graphic representation of a track.
- There may be more than one clue at a location, or there may not be any clue at all. However, only one clue will be revealed with each search.
- At any time while searching for a clue, press ESCAPE to use the Notepad or the Field Guide, or to attempt to name the animal.
- When there are no more clues to be found, the screen prompts the student to attempt to name the mystery animal.

Each animal will have between five and ten clues scattered among the locations in the site. However, only five clues may be looked at. Therefore, where the student looks for clues has an important impact on which clues are seen. A student who looks only on the forest floor may not have the opportunity to see a clue in the trees.

At the Expert Tracker level, there are five to ten clues for *each* of the two animals being tracked. However, only a total of ten of these clues may be seen. If the search for clues is not distributed among several locations, most of the clues may come from only a single animal.

There is no way to return to a previously discovered clue, so it is important to take good notes, either with the Notepad option or with pencil and paper.

NAMING THE MYSTERY ANIMAL

Name It may be selected at any time during the **Animal Trackers** activity. The object of the activity is not to name the animal using as few clues as possible, but to minimize the number of attempts at naming it. Complete success is to name it on the first try, regardless of how many clues that have been seen. Students are encouraged to view as many clues as they need to make a positive identification before they select Name It.

- When Name It is selected, **Animal Trackers** asks if the student is ready to attempt to name the mystery animal. Since the object of the game is to identify the animal with as few guesses as possible, the student may answer No to this question and continue to gather more information and study the Field Guide.
- If the student answers Yes, **Animal Trackers** presents a list of the animals that may have left the clues.
- At the Novice Tracker level this list contains 8 animals, while at the Experienced and Expert Tracker levels this list contains 24 animals. Use the arrow keys to highlight an animal, and then press RETURN.
- If the selected animal is incorrect, the student may return to the game and try again, or end the activity and have the correct animal revealed.
- At the Expert Tracker level two animals must be identified. If the student correctly identifies one of the animals, **Animal Trackers** presents the list of animals a second time for the student to make the second identification. If either of the identifications is incorrect, then the student may return to the game and try again, or end the activity and have the correct animals revealed.
- When the mystery animal is correctly identified, **Animal Trackers** congratulates the student. The student may then review the Notepad and the Field Guide, or return to the Main Menu.

ANIMAL TRACKERS CLASSROOM ACTIVITIES

There are several places in the science curriculum where you might use **Animal Trackers**. For example, you might tie it in with any of the following themes:

Animal life
Animals of North America
Mammals
Biomes of North America
Relationships among organisms
Problem solving in science

Regardless of which of these themes you choose to emphasize, you should be able to find useful ideas in the following sections. These sections include introductory activities, activities with the software, and follow-up activities.

INTRODUCTORY ACTIVITIES

Students will get the most benefit from **Animal Trackers** if they first cover the material in class. This gives them a base of knowledge from which to begin. Before students start the program, get a discussion going on some topic suggested by the material. Some possible questions to explore are:

1. What mammals live in North America? Form teams with four students on each team. Each team has five minutes to list as many North American mammals as they can think of.
2. What are the similarities and differences among various animals? For example, what are ten similarities between a fox and a rabbit? What are five differences?
3. What are the major biomes (habitat zones) of North America? **Animal Trackers** mentions woodlands, grasslands, and desert. Most texts will subdivide these further into a half dozen or more biomes.
4. What animals are carnivores (meat eaters) and what animals are herbivores (plant eaters)?
5. How are different animals adapted to their environment? For example, a squirrel, a trout, and a mole.
6. How might you know that an animal has been around, even if you have not seen it? Have you ever found a sign of animal activity?

Another introductory activity is to let your students examine some field guides. For elementary school students, look for a guide that puts the picture of each animal on the same two-page spread as the related description.

Introduce your students to using a field guide by selecting a set of six to ten mammals covered by the field guide you are using. Provide a list of these mammals to the students, either as the whole class or in small groups. Get them started by having them write down the page numbers where each animal is found. Then have them use the field guide to answer the questions on the Using a Field Guide Worksheet.

ANIMAL TRACKERS
USING A FIELD GUIDE

Use the list of animals that your teacher gives you to solve the following challenges:

1. Which animal on the list is the smallest? Which is the largest? Rank them in order from smallest to largest. What measure should be used for comparing size? Weight is a good choice, but height or length are also good possibilities. What do you do if the weight (or whatever) is given as a range? A good approach is to use the midpoint of the range. What do you do if the size for males and females is listed separately, and they are not the same?

2. Which animals on the list eat mostly meat? Which eat mostly plants? Are there any which eat a lot of both meat and plants?

3. Which animals tend to nest in holes in the ground? Which tend to nest in any sheltered cavity (such as a cave or a hollow log)? Which build nests up in trees? Which make no nests at all?

4. Which animals on the list can be found in your state? Use this question only if your field guide includes range maps with state boundaries.

5. Which animals live in deserts? Which live in grasslands? Which live in forests?

6. Using the range maps in your guide, determine which animal's range extends the farthest south. Determine which extends the farthest north. Rank the animals according to the north-south location of their range, starting with the northernmost. Because of the overlap and unequal sizes among the ranges, there may be considerable debate as to the most appropriate order. Have the students explain and defend their rankings.

7. Read the information in the field guide about each animal on your list. Notice that some of the information describes what the animal looks like, and some of the information describes what the animal does. Choose one animal on your list. Is there anything that this animal does that might leave behind signs of its presence? Write down five signs that you might be able to find.

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ANIMAL TRACKERS
INTRODUCTION TO ANIMAL TRACKERS

Group size: Entire class

Classroom setup: One computer, attached to a large display

1. Set up the computer with a large display so that the entire class can see at the same time. To accomplish this you need a large monitor, a video projection system, or an LCD projection panel in conjunction with an overhead projector.

2. Explain to the class the following scenario: "There is an animal in the woods, and it is our task to figure out what that animal is. However, animals are often difficult to see in the wild. They tend to hide or run away when humans come near. So we will have to identify this animal by the clues it leaves behind, rather than by how it looks."

3. Start up the disk, choosing "Woodland Animals" and "Novice Level." When you get to the screen where you search for the first clue, explain the following: "The animal we are tracking has left many clues scattered around the woods. We are allowed to examine five of these clues. In some places there may be more than one clue, while in other places there may be none. Let's find the first clue." Let the class decide where to look for the first clue.

4. After you find the first clue, point out that your options now include the Notepad, the Field Guide, Next Clue, and Name It. Choose the Notepad, and show how to make notes. Let the class decide what notes should be written about the first clue.

5. Now demonstrate the Field Guide. Explain that there are 8 animals in the Field Guide, and the mystery animal is one of these eight. Use the Field Guide to search for information that fits with the first clue. Have the class identify those animals that have been ruled out by this first clue. Then have the class identify those animals that are the best candidates at this point.

6. Continue the cycle of: a) searching for clues
   b) taking notes about the clues, and
   c) correlating the clues with the field guide
   until the class feels certain that it knows what the animal is. Encourage the class to examine one more clue (if less than 5 have been used) to support their hunch. Then choose Name It and see if the class is correct.

7. Explain that besides the woodland, other biomes that can be examined are the grassland and the desert. Also explain that at the Experienced level there are 24 animals in the Field Guide (rather than 8), and that at the Expert level TWO animals have left clues, and BOTH must be identified.

ANIMAL TRACKERS
INTRODUCING THE NOVICE AND EXPERIENCED LEVELS

Group size: 2-5 students per group

Classroom setup: Several computers

1. Divide the class so that there are 2-5 students in each group. Ideally, there should be a computer for each group, so that all groups can work simultaneously.

2. Assign specific roles to each member of each team. Alternatively, identify the roles, but let the students assign the roles within the team. For example, with teams of four students each, the roles could be:
    a) Scout - in charge of searching for the clues ("Next Clue" option)
    b) Scribe - in charge of keeping notes on all clues found ("Notepad" option)
    c) Researcher - in charge of doing research as to what animals match the clues ("Field Guide" option)
    d) Safari leader - in charge of deciding what the animal actually is ("Name It" option); also makes sure that the team members take turns at the computer keyboard at the appropriate stages

3. Tell the students that their objective is to identify the mystery animal on their first attempt, and that they may examine up to 5 clues before making that attempt.

4. Give a copy of the Record of Tracks Worksheet (page 21) to each team. Point out that the chief purpose of this worksheet is for sketching any tracks that they find. Explain that these sketches are useful not only for identifying the mystery animal, but that these sketches will also be used in some of the follow-up activities.

5. Get the groups started on the Novice level. As the teams work, encourage interaction between teams as well as within teams. Especially encourage the sharing of the sketches they have made.

6. When a team succeeds in identifying an animal, have them move to a different biome. If they succeed in naming it on their first attempt, then have them move to the Experienced level.

7. Move from group to group, helping out with strategy as needed. Give special attention to any groups that seem to be lagging behind.

8. Follow up by leading a discussion using some of the discussion topics mentioned in the Follow-up Activities section of this Teacher's Guide.

ANIMAL TRACKERS
SOLVING THE EXPERT LEVEL

Group size: 2-5 students per team

Classroom setup: Several computers

1. Have students brainstorm the various strategies they used for succeeding at the Novice and Experienced levels of **Animal Trackers**. Help them along, as needed, by mentioning some of the strategies listed in the next section of this Teacher's Guide, "Developing and Sharing Strategies." Emphasize that at the Expert level there are two animal leaving clues, and that the students will have to develop effective strategies for sorting out which clues belong to which animal.

2. Divide the class into groups of 2-5 students each. Create specific roles for each member of the team, but allow the team members to decide who will take each role. Of particular value is to create roles that encourage careful examination of each clue. For example, if the teams each consist of 3 students, the roles could be as follows:

    a) "Foods and eating" expert - Examines all clues for evidence as to what the animal eats and how it eats it

    b) "Tracks and size" expert - Examines all clues for evidence as to the size of the animal and to the nature of the tracks it makes

    c) "Habitat and home" expert - Examines all clues for evidence as to the preferred habitats of the animal, as well as to the type of home or nest it creates

3. Give a copy of the Record of Tracks Worksheet (page 21) to each team. Point out that because there are two animals leaving clues, the team may examine as many as 10 clues.

4. Allow the groups to get started on the Expert level. As before, encourage interaction between teams as well as within teams, along with the sharing of sketches.

5. Move from group to group, helping out with strategy as needed. When a team succeeds in identifying BOTH animals, have them move to a different biome.

6. Follow up by leading a discussion about what new strategies they used at the Expert Level. If possible, schedule a field trip to look for animal signs in the wild.

ANIMAL TRACKERS
DEVELOPING AND SHARING STRATEGIES

Perhaps the single best thing you can do to foster the development of strategic thinking is to encourage your students to work in teams. In pairs or small groups students can verbalize their hypotheses and their strategies, as well as receive and critique ideas from their partners. This sort of discussion tends to promote not only deeper thinking, but also greater interest in the activity. Therefore, even though you may have access to a computer lab with a computer for each student, you may want to pair or group them when involved in problem-solving activities such as **Animal Trackers**.

As your students become familiar with **Animal Trackers**, they will develop various strategies for succeeding at it. There are many possible strategies, and they may all be effective, although to varying degrees. Encourage your students to share strategies, both during the computer activity and afterwards during the follow-up discussions. Listed below are just a few of the possible strategies that may be helpful:

- Distribute your search for clues among the various possible locations. By looking in different places, you increase the odds of getting more kinds of information. This is especially important at the Expert Level, to avoid getting too many clues on just one of the two animals.

- Each time you find a clue, try to categorize it as to the type of information it presents. Does it tell you about the animal's food, its nest, its tracks, or what?

- Each time you find a clue, examine it for all of its implications. For example, a hole in the ground tells you not only that the animal nests in a burrow, but the size of the burrow opening also tells you the approximate diameter of the animal's body.

- Each time you find a clue, use it to eliminate certain animals from the list of possibilities. Thus, by the process of elimination, you can eventually narrow the list of possibilities to just one animal.

- Whenever you find tracks, carefully sketch them. Tracks contain all sorts of information, such as the number and arrangement of toes, and the pattern of footfalls tells you how the animal walks or runs. Without the sketch, it is almost impossible to match the descriptions in the Field Guide to your track.

- If you want to find tracks, the most likely place is the forest floor or soil surface, and the next best place is the stream banks.

- Notice the places where you find the clues. This provides a hint as to the preferred habitat of the animal. For example, an animal that spends most of its time near water, such as a beaver, muskrat, or otter, will leave most of its clues there.

- To maximize your chances of naming the animal correctly, examine as many clues as possible before naming it.

- Sometimes you may encounter a clue that is not referenced in the Field Guide. Keep in mind that any animal may occasionally engage in behavior that is not specifically mentioned in the guide.

- Remember that a clue may not be worded in the same way as the corresponding information in the Field Guide. For example, a clue you may find is "nibbled grass blades," indicating that the mystery animal has been eating grass. But the Field Guide may only mention that the animal eats "green vegetation" or something of that sort.

- At times, a new clue may challenge you to re-evaluate your earlier conclusions. For example, you may have eliminated all animals except the herbivores from your list of possibilities, but the next clue indicates that the animal eats meat. Unless you are playing at the Expert level (where two different animals leave signs), then you will have to re-examine your conclusion that the mystery animal is an herbivore.

ANIMAL TRACKERS
FOLLOW-UP ACTIVITIES

In any activity involving higher-order thinking skills, the follow-up activities can be as important as the activity itself. First of all, the students have been deeply involved in interpreting information, making deductions, planning strategies, creating and testing hypotheses, and finally reaching a goal. They now need a chance to debrief, to reflect on their thought processes, to explain the methods by which they achieved their goals, and to compare their experiences with those of other students.

Secondly, during their interaction with **Animal Trackers**, the students were exposed to a great deal of information. To the extent that this information is new to them, much of it is in their short-term memories. A good discussion or follow-up activity can help move some of this information into long-term memory.

The following list provides just a few of the possibilities for follow-up activities. Hopefully, this list will not only supply you with ideas, but will stimulate your imagination as to some of the other possibilities.

1. Bring closure to the computer activity by moderating a class discussion on some of the following topics: Note that these questions begin with the specific, then move to the general and abstract.
    - How many were able to name an animal correctly on the first try?
    - What single clue was most useful in identifying the mystery animal?
    - What strategies were used to decide which animal you were tracking?
    - Did you ever encounter a clue that had you fooled, causing you to name an animal incorrectly? Why were you fooled?
    - How often did you use the Field Guide? How did you use it?
    - What did the tracks of your animal look like?
    - What mammals did you find in the woodland? In the grassland? In the desert? (See the Preferred Habitats Worksheet, page 23.)
    - What mammals preferred to remain in or near the water?
    - What mammals live in burrows in the ground?
    - What mammals climbed trees? How could you tell?
    - What mammals eat mostly meat? What mammals eat mostly plants? (See the Preferred Foods Worksheet, page 25.)
    - Under what conditions would you be most likely to find tracks of animals? To find the clearest tracks? How might this be affected by the season of the year or the type of soil?
    - What animals might you be able to track in your own community? Where would be the best areas to look for tracks?
    - What characteristics tend to be shared by meat-eating animals? What characteristics tend to be shared by plant-eating animals?

2. Play a game of "20 Questions." (See the Twenty Questions Worksheet, page 27.) One student thinks of an animal, and the other students try to guess what it is by asking questions. All questions should be answerable with "yes" or "no." If the animal has not been identified within 20 questions, then the class has been stumped. You may wish to limit the list of animals to those included in **Animal Trackers**.

3. Draw an animal track on the board for the class to see. Now have students take turns identifying a mammal that could *not* have made that track, justifying their answers. Finally, direct the class to come to a consensus as to what animal probably *did* make the track.

4. Go on a field trip looking for animal signs. Have your students take along notepads for recording the signs. For each sign they find, they should make a sketch of it, accompanied by a short explanation. Let them know in advance that positive identification of animals from signs is often not possible. However, for each sign, discuss the animals most likely to have made it. If you find any clear, deep prints, you might try to make plaster casts of them.

5. Have your class conduct an experiment about leaving tracks. Find a dusty or sandy patch of ground on which to conduct the experiment. Direct the students to make tracks by walking, running, hopping, and skipping across the plot. If the plot is small, they may have to erase it several times in the course of the experiment. After the students are confident that they can distinguish the tracks of the different gaits, direct one student to make a track across a different plot, out of sight of your students. Challenge the class to identify the gait from the track.

6. Have the class do a project on the rare and endangered mammals of North America. What species are on this list? For each species, what are the reasons that the species is rare or endangered?

7. Have the class do a project on the taxonomy of North American mammals. What families of mammals are represented in North America? What types of animals have been placed in each family? Within a given family, what characteristics do the animals have in common?

ANIMAL TRACKERS
REPRODUCIBLE WORKSHEETS

This section of the Teacher's Guide contains several worksheets that can be reproduced and distributed to your students. The first two worksheets are designed to be used in tandem with the software, while the remaining worksheets are for use with the follow-up activities.

Worksheet 1: Record of Tracks

For students who will be using the on-line Notepad, this worksheet provides a location for sketching the tracks they find. Students can build up a collection of sketches of tracks for reference as they play and for comparison with other students.

Worksheet 2: Tracker's Log

For students who may not be comfortable with the on-line Notepad, this worksheet provides a location for keeping notes. In addition, using this worksheet results in a permanent record of the encounter. Students can later compare notes, looking for similarities and differences.

Worksheet 3: Preferred Biomes

As a follow-up activity, students can complete this worksheet, referring back to the notes they made while at the computer. The object is to identify in which of the three biomes of the program the 24 different animals can be found. Students will probably have to compare notes in order to get all the information they need. An answer key follows the worksheet.

Worksheet 4: Preferred Foods

This worksheet can be used as an introductory activity or a follow-up activity. Using a commercial field guide, or their notes from using **Animal Trackers**, students need to decide for each of the 24 animals whether it is best described as an herbivore, a carnivore, or an omnivore. This requires some synthesis of the information about preferred foods. An answer key follows the worksheet.

Worksheet 5: Twenty Questions

This worksheet can be used for taking notes during a game of 20 Questions. See the description in the section "Follow-up Activities." Each student should keep notes individually. This will assist in remembering what questions have already been asked, and in focusing on what questions have *not* been asked yet.

ANIMAL TRACKERS
RECORD OF TRACKS

Animal name:

Biome:

Sketch of tracks:

Animal name:

Biome:

Sketch of tracks:

Animal name:

Biome:

Sketch of tracks:

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ANIMAL TRACKERS
TRACKER'S LOG

Biome:

Level of difficulty:

Clue #1:

Clue #2:

Clue #3:

Clue #4:

Clue #5:

The Animal Is: _____

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ANIMAL TRACKERS
PREFERRED HABITATS

Put X's in the appropriate boxes below to indicate the biomes in which each animal can be found.

	Woodland	Grassland	Desert
Deer mouse			
Cottontail rabbit			
Striped skunk			
Raccoon			
Woodchuck			
White-tailed deer			
Gray fox			
Mountain lion			
Chipmunk			
Gray squirrel			
Prairie dog			
Bobcat			
Porcupine			
Badger			
River otter			
Bison			
Kangaroo rat			
Long-tailed weasel			
Muskrat			
Beaver			
Ringtail			
Pronghorn			
Black bear			
Gray wolf			

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ANIMAL TRACKERS
PREFERRED HABITATS
ANSWER KEY

	Woodland	Grassland	Desert
Deer mouse	X	X	X
Cottontail rabbit	X	X	X
Striped skunk	X	X	X
Raccoon	X		X
Woodchuck	X	X	
White-tailed deer	X	X	
Gray fox	X	X	X
Mountain lion	X		X
Chipmunk	X	X	X
Gray squirrel	X		
Prairie dog		X	
Bobcat	X		X
Porcupine	X		
Badger		X	X
River otter	X		
Bison	X	X	
Kangaroo rat		X	X
Long-tailed weasel	X	X	
Muskrat	X	X	
Beaver	X		
Ringtail	X		X
Pronghorn		X	X
Black bear	X		
Gray wolf	X		

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ANIMAL TRACKERS
PREFERRED FOODS

For each animal below, decide if it is best described as an herbivore, a carnivore, or an omnivore.

	Herbivore	Carnivore	Omnivore
Deer mouse			
Cottontail rabbit			
Striped skunk			
Raccoon			
Woodchuck			
White-tailed deer			
Gray fox			
Mountain lion			
Chipmunk			
Gray squirrel			
Prairie dog			
Bobcat			
Porcupine			
Badger			
River otter			
Bison			
Kangaroo rat			
Long-tailed weasel			
Muskrat			
Beaver			
Ringtail			
Pronghorn			
Black bear			
Gray wolf			

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ANIMAL TRACKERS
PREFERRED FOODS
ANSWER KEY

Note: The animals are classified here according to their usual diet. However, many herbivores occasionally eat meat, and most carnivores occasionally eat plants.

	Herbivore	Carnivore	Omnivore
Deer mouse	X		
Cottontail rabbit	X		
Striped skunk			X
Raccoon			X
Woodchuck	X		
White-tailed deer	X		
Gray fox		X	
Mountain lion		X	
Chipmunk	X		
Gray squirrel	X		
Prairie dog	X		
Bobcat		X	
Porcupine	X		
Badger		X	
River otter		X	
Bison	X		
Kangaroo rat	X		
Long-tailed weasel		X	
Muskrat	X		
Beaver	X		
Ringtail	X		
Pronghorn	X		
Black bear			X
Gray wolf		X	

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ANIMAL TRACKERS
TWENTY QUESTIONS

As each question is asked, write it down, then circle the answer.

1. _____ yes no
2. _____ yes no
3. _____ yes no
4. _____ yes no
5. _____ yes no
6. _____ yes no
7. _____ yes no
8. _____ yes no
9. _____ yes no
10. _____ yes no
11. _____ yes no
12. _____ yes no
13. _____ yes no
14. _____ yes no
15. _____ yes no
16. _____ yes no
17. _____ yes no
18. _____ yes no
19. _____ yes no
20. _____ yes no

The Mystery Animal is:

_____

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ANIMAL TRACKERS
THE ANIMALS IN ANIMAL TRACKERS

Twenty-four mammals are listed in the field guide in the Experienced and Expert Tracker levels of **Animal Trackers**. Only the first eight are listed in the Field Guide in the Novice level. Of course, there are more than 24 kinds of mammals that can be found in North America. These particular mamals were chosen on the basis of being fairly widespread in their distribution or because they are well-known.

Of the mammals included in **Animal Trackers**, most represent distinct species. However, a few represent an amalgam of two related species. The exact list of species is as follows:

Deer mouse	*Peromyscus maniculatus*
[Eastern & desert] cottontail	*Sylvilagus floridanus & S. auduboni*
Striped skunk	*Mephitis mephitis*
Raccoon	*Procyon lotor*
Woodchuck (groundhog)	*Marmota monax*
White-tailed deer	*Odocoileus virginianus*
Gray fox	*Urocyon cinereoargenteus*
Mountain lion (cougar, puma)	*Felis concolor*
[Eastern & least] chipmunk	*Tamias striatus & Eutamias minimus*
[Eastern & western] gray squirrel	*Sciurus carolinensis & S. griseus*
[Blacktail] prairie dog	*Cynomys ludovicianus*
Bobcat	*Felis rufus*
Porcupine	*Erethizon dorsatum*
Badger	*Taxidea taxus*
River otter	*Lutra canadensis*
Bison (buffalo)	*Bison bison*
[Ord's] kangaroo rat	*Dipodomys ordii*
Long-tailed weasel	*Mustela frenata*
Muskrat	*Ondatra zibethicus*
Beaver	*Castor canadensis*
Ringtail (cacomistle)	*Bassariscus astutus*
Pronghorn (antelope)	*Antilocapra americana*
Black bear	*Ursus americanus*
Gray wolf (timber wolf)	*Canis lupus*

ANIMAL TRACKERS
BIBLIOGRAPHY

The following books are recommended for use in conjunction with **Animal Trackers**. This is not intended to be a comprehensive list; you may be able to find other excellent books that are not listed here. Those books that are especially appropriate for students in the primary grades are marked with an asterisk (*).

FIELD GUIDES TO NORTH AMERICAN MAMMALS

* Alden, Peter. 1987. *Peterson First Guide to Mammals of North America*. Houghton Mifflin Company (Boston). 128 pp.

    A simplified version of the Burt's *Field Guide to the Mammals*; especially suitable for young people.

Burt, William Henry. 1976. *A Field Guide to the Mammals*, 3rd ed. Houghton Mifflin Company (Boston). 289 pp.

    One of the famous Peterson series of field guides.

Collins, Henry Hill, Jr., ed. 1981. *Harper & Row's Complete Field Guide to North American Wildlife*, eastern edition. Harper & Row. 714 pp.

    Covers not only mammals, but many other groups of animals as well.

Ransom, Jay Ellis, ed. 1981. *Harper & Row's Complete Field Guide to North American Wildlife*, western edition. Harper & Row. 809 pp.

    Differs only in its geographical emphasis from the eastern edition.

Whitaker, John O., Jr. 1980. *The Audubon Society Field Guide to North American Mammals*. Alfred A. Knopf (New York). 745 pp.

    Differs from other field guides in that it uses photographs of animals instead of paintings.

* Zim, Herbert S., and Donald F. Hoffmeister. 1955. *Mammals: A Field Guide to Familiar American Species*. Golden Press (New York). 160 pp.

    One of a long-popular series for young people.

BOOKS ABOUT ANIMAL TRACKS

* Arnosky, Jim. 1979. *Crinkleroot's Book of Animal Tracks and Wildlife Signs*. G. P. Putnam's Sons (New York).

Takes the reader on a tour of the woods, pointing out tracks and field signs and discussing the animals that made them.

Falkus, Hugh. 1978. *Wildtrack: Reminiscences of a Nature Detective*. Holt, Rinehart and Winston (New York). 254 pp.

Includes many fine black and white photographs of tracks and other signs, all of which were encountered in Great Britain.

* George, Jean Craighead. 1958. *Snow tracks*. E. P. Dutton & Co. (New York). 63 pp.

Tells the story of a snowy evening in the woods, in which a wide variety of animals interact by making or following tracks.

Halfpenny, James. 1986. *A Field Guide to Mammal Tracking in Western America*. Johnson Books (Boulder). 161 pp.

A good accompaniment to Murie's *Field Guide to Animal Tracks*.

* Kirn, Ann. 1970. *Let's Look at More Tracks*. G. P. Putnam's Sons (New York). 48 pp.

Designed for early readers. For each animal, tracks and other clues are presented to the reader, who then guesses the animal's identity.

Murie, Olaus J. 1974. *A Field Guide to Animal Tracks*, 2nd ed. Houghton Mifflin Company (Boston). 375 pp.

The authoritative book on animal tracks. Part of the Peterson series, but takes a more narrative approach than the others in the series.

Stokes, Donald W., and Lillian Q. Stokes. 1986. *A Guide to Animal Tracking and Behavior*. Little, Brown and Company (Boston). 418 pp.

A particularly good accompaniment to **Animal Trackers**. Part One is about tracks and signs. This section is unique in that it is organized by the type of field sign: tracks, scats, claw marks on trees, holes in the ground, trails, etc.. Part Two is organized by species, discussing the behavior and life styles of the various North American mammals.

* Webster, David. 1972. *Track Watching*. Franklin Watts, Inc. (New York). 90 pp.

Examines human and vehicular tracks as well as animal tracks.

OTHER USEFUL BOOKS

Brown, Vinson. 1976. *The Explorer Naturalist.* Stackpole Books (Harrisburg, Pa.). 288 pp.

The first half provides all sorts of ideas for experiments that a budding "explorer naturalist" might conduct. The second half summarizes the various biomes or habitat zones in North America and what species of plants and animals live in each.

* Crump, Donald J., ed. 1981. *National Geographic Book of Mammals* (two volumes). National Geographic Society (Washington, D.C.). 608 pp.

A beautiful book of full-color photographs and limited text, appropriate for use with any age student. The content emphasizes related groups of mammals rather than individual species.

Forsyth, Adrian. 1985. *Mammals of the American North.* Camden House (Camden East, Ontario). 351 pp.

Focuses exclusively on North American mammals. It is a sort of hybrid between a field guide and a coffee table volume. Each mammal is given several pages, beginning with a summary description and range map reminiscent of field guides, but then continuing with a short essay about the animal's behavior. Excellent photographs of each species are also included.

Animal Trackers:
North American Mammals

Science

Overview

Students search for and collect clues left by a mystery animal, then refer to an on-line Field Guide and use their deductive skills to select the identity of the mystery animal.

READING LEVEL
4th Grade

GRADE LEVEL
Pre K 1 2 3 4 5 6 7 8 9 10 11 12 A

TIME REQUIRED
15-25 minutes

Curriculum

PREREQUISITE SKILLS
- Basic deductive skills

OBJECTIVES
- Gather information and make organized lists
- Correlate gathered information with structured information in a Field Guide
- Learn characteristics of several North American mammals
- Extract useful information from an illustration

PROBLEM SOLVING SKILLS
- Examining assumptions
- Making organized lists
- Successive scanning
- Information gathering

Courseware

NOTEWORTHY FEATURES
- Three different settings to explore
- Three levels of difficulty in each setting
- At the Expert level, students must track two animals simultaneously
- An on-line Note Pad feature allows easy note taking
- Students are encouraged to make thorough investigations; no penalty for incorrect solutions

TEACHER OPTIONS
- None

Hardware

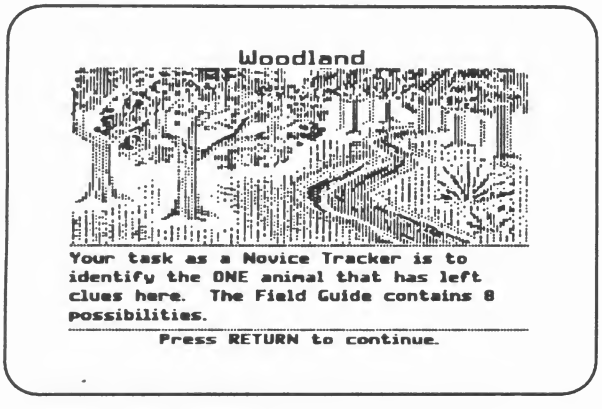
- Apple

DESCRIPTION

ANIMAL TRACKERS lets students identify mystery animals from one of three biomes: woodland, grassland, or desert. The student selects a biome from the Main Menu. The challenge is the same in each of the biomes; the differences come from a different selection of animals and their accompanying clues.

After choosing a biome, the student must select a difficulty level. At the Novice Tracker level, any one of eight animals may have left clues. The challenge is to identify this animal. At the Experienced Tracker level, any one of 24 animals may have left clues. At the Expert Tracker level, any two of 24 animals may have left clues, and both must be identified.

Clues are hidden in any of five locations in each biome. Selecting a location reveals either a textual or graphic clue. The Note Pad option allows the student to record observations, which is important as clues can only be seen once. The Field Guide option permits the student to view information about the possible animals. Next Clue permits the student to search for and look at another clue, up to as many as ten. Name It allows the student to attempt to identify the mystery animal.

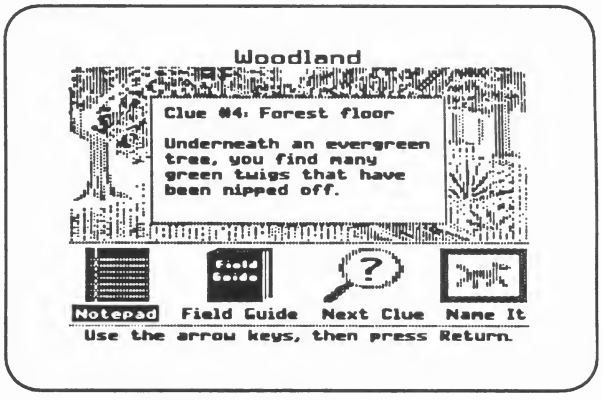

Woodland
Your task as a Novice Tracker is to identify the ONE animal that has left clues here. The Field Guide contains 8 possibilities.
Press RETURN to continue.

GETTING STARTED

Students will get the most benefit from **ANIMAL TRACKERS** if they first cover the related material in their textbook. After your class has read the chapter, get a discussion going on some topic suggested by the material. Some possible questions to explore are:

- What mammals live in North America? Form teams with four students on each team. Each team has five minutes to list all the North American mammals they can think of.
- What are the similarities and differences among various animals? For example, what are ten similarities between a fox and a rabbit? What are five differences?
- What are the major biomes (habitat zones) of North America? Animal Trackers mentions woodlands, grasslands, and desert.
- What animals are carnivores (meat eaters) and what animals are herbivores (plant eaters)?
- How are different animals adapted to their environment? For example, a squirrel, a trout, and a mole.
- How might you know that an animal has been around, even if you have not seen it? Have you ever found a sign of animal activity?

Another introductory activity is to let the students examine some field guides. See the Bibliography for some recommended titles.


Woodland
Clue #4: Forest floor
Underneath an evergreen tree, you find many green twigs that have been nipped off.
Notepad
Field Guide
Next Clue
Name It
Use the arrow keys, then press Return.

SUGGESTED EVALUATION

Lead a class discussion about the animals in **ANIMAL TRACKERS**. Discuss the strategies that students used to identify the animals. Ask how the students used the Field Guide in their investigation.

SPECIAL KEY

- CTRL-E exits program at any time

To use the program

1. Turn on the television or monitor.
2. Insert the disk securely into the disk drive with the label facing up.
3. Turn on the computer (the on-off switch is on the back left side of the computer).
4. The disk drive light will turn on. If a disk error message is displayed, or a loud rasping noise is emmitted, or the drive does not stop running after a minute or so, turn the Apple off and make sure your disk is placed correctly in the disk drive.
5. The *WINGS for learning* logo will appear, followed by the opening screen.
6. Follow the instructions in the program.
7. If at any time during the program you want to stop, hold down the CTRL (CONTROL) key and press the E key.

Turning off the system

1. Remove the disk from the disk drive and put it in a safe place.
2. Turn off the computer.
3. Turn off the television or monitor.

APPLE IIGS: Control Panel Setting

To allow your Apple IIGS to work properly with *WINGS for learning* software, certain Control Panel settings should be selected. The Apple IIGS retains these settings even after the power is turned off.

To Use the Control Panel:

- Enter the Control Panel main menu by holding down the CONTROL and OPTION keys, and then press RESET (the rectangular key located above the number keys). If your Apple IIGS is in an Apple IIe case, use the closed-apple (🍎) key instead of OPTION.
- Press the 1 key to enter the Control Panel.
- Use ↑ and ↓ to highlight the feature you want to change and press RETURN. Again use the ↑ and ↓ arrow keys to highlight a specific option and change it by using the ← and → arrow keys.
- After you have finished making changes, select Quit, and press RETURN.
- Turn off the Apple IIGS, and restart.

To Change the Display:

- Highlight **Display** and press RETURN.
- Set **Type** to **Color**.
- Set **Columns** to **40**.
- Set **Text** to **White**.
- Set **Background** to **Black**.
- Set **Border** to **Black**.
- Press RETURN to save the changes and to go back to the Control Panel.

To Change the System Speed:

- Highlight **System Speed** and press RETURN.
- Set **System Speed** to **Normal**.
- Press RETURN to go back to the Control Panel.

Setting the Slots:

Highlight **Slots** and press RETURN.

Setting Disk Drives:

For <u>any</u> disk drive setup, set:	Startup Slot: Scan
• If you have a 3½" disk drive, set:	Slot 5: Smart Port
• If you have a 5 ¼" disk drive, set:	Slot 6: Disk Port

Printing to a printer connected to your computer only:

• To print from the printer port, set:	Slot 1: Printer Port
• To print with a special card, choose the slot your card is in and set it to "Your Card":	Slot_: Your Card

Printing to a printer on the AppleTalk network:

To use AppleTalk, set:	Slot 7: Built-in AppleTalk
• If it is connected to the printer port, set:	Slot 1: Your Card
• If it is connected to the modem port, set:	Slot 2: Your Card

Q & A

WINGS for learning Courseware

1. **What happens if a program will not load or run?**
   Call us toll-free at (800) 321-7511 and we'll send you a new disk.

2. **What happens if I find an error in the program?**
   We have thoroughly tested the programs that *WINGS for learning* carries so we hope this does not happen. But, if you find an error, please note what you did before the error occurred. If a message appears on the screen, please write the message down. Then fill out the evaluation form or call us with the information. We'll correct the error and send you a new disk.

3. **What happens if the courseware is accidentally destroyed?**
   WINGS for learning has a lifetime guarantee on its courseware. Send us the product that was damaged and we'll send you a new one.

4. **Can I copy the disks?**
   The material on the disks is copyrighted. You *should not* copy the disks.

5. **How do I stop the program in the middle to go on to something new?**
   Hold down the CTRL (CONTROL) key and press the E key. On some programs the ESC (ESCAPE) key is used.

6. **Can I remove the disk from the disk drive after I have loaded the program?**
   It is not recommended. Most programs use the disk for accessing programs, saving student scores, and changing program settings. If the disk is not in the disk drive an error may result.

For other permissions and restrictions, see the permissions page at the front of this guide.

#1722 - ANIMAL TRACKERS
For the 64K APPLE II family
WINGS for learning
1600 Green Hills Road • P.O. Box 660002
Scotts Valley, CA 95067-0002
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DISCARD
N.P.
Disk
591
A

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保 護
Never
Nunca
Jamais
Nie
絶対禁止
No
No
Non
Falsch
注 意
10°C→52°C
50°F→125°F
Insert Carefully
Insertar
Inserer avec soin
Sorgfältig Einsetzen
挿入注意
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